Assisted Natural Regeneration (ANR): a tool for degraded tropical forests rehabilitation in Central Africa

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IUFRO International Conference
Research Priorities in Tropical Silviculture: Towards New paradigms ?

15-18 November 2011 - Montpellier, France

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LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

Projet MAKALA

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A major part of anthropic impacts on natural tropical forests in central Africa is related to unmanaged shifting agriculture and fuelwood extraction by local communities, mainly along access tracks (roads, rivers,...) and at the edge of forests

Assisted Natural Regeneration (ANR) has been largely designed and used in dry countries of Sahel to improve the number of trees in the landscapes

In an EU project in DRC and Congo (Makala), we have adapted these ANR techniques to shifting agriculture in humid countries.

Some useful trees are designated by a ring of white paint, they will be spared by the loggers at the time of harvesting trees

Then, the harvested wood is converted into charcoal. The leaves and branches are burned, trying to preserve from fire the trees marked by a white ring.

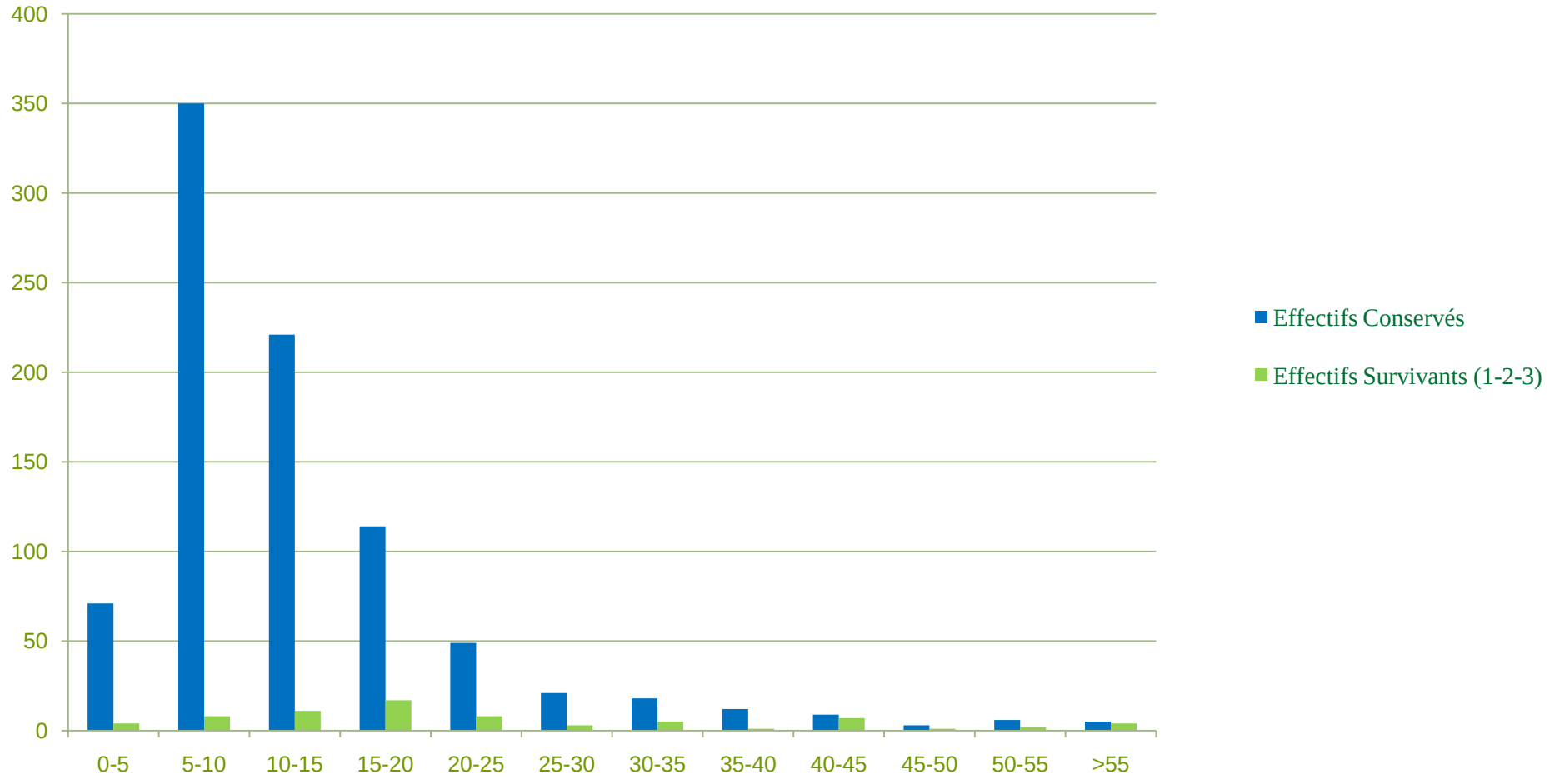

***Figure*: Distribution of numbers of *trees preserved* and *surviving fire* ,by diameter classes (cm)**

Farmers have preserved about 66 trees / ha, from 31 different species. After the fire, the survival rate is low (10%), 75% at the edge of the plot, but these trees are of great importance for seed production.

Results: Trees preserved

Numbers of trees preserved and surviving fire, by species

Species	Numbers preserved	Numbers surviving fire	Survival Rate (%)
Albizia adianthifolia Benth	103	11	10,7
Hymenocardia ulmoïdes	52	2	3,8
Markhamia tomentosa	27	2	7,4
Millettia laurentii	86	9	10,5
Oncoba welwitschii	29	3	10,3
Pentaclethra eetveldeana	177	10	**5,6**
Vitex congolensis	11	5	**45,5**

In the ash, the corn is seeded and cassava cuttings are planted.

At the time of crops weeding, agricultural workers are asked to preserve some of the seedlings and coppice trees, marked by a white pole

.

We used the capacity of sprouts and seeds of remaining local forest species

and induced specific management techniques amongst farmers.

The results show a very good reactivity and regrowth of natural forest species at farmers' low cost and low technical means

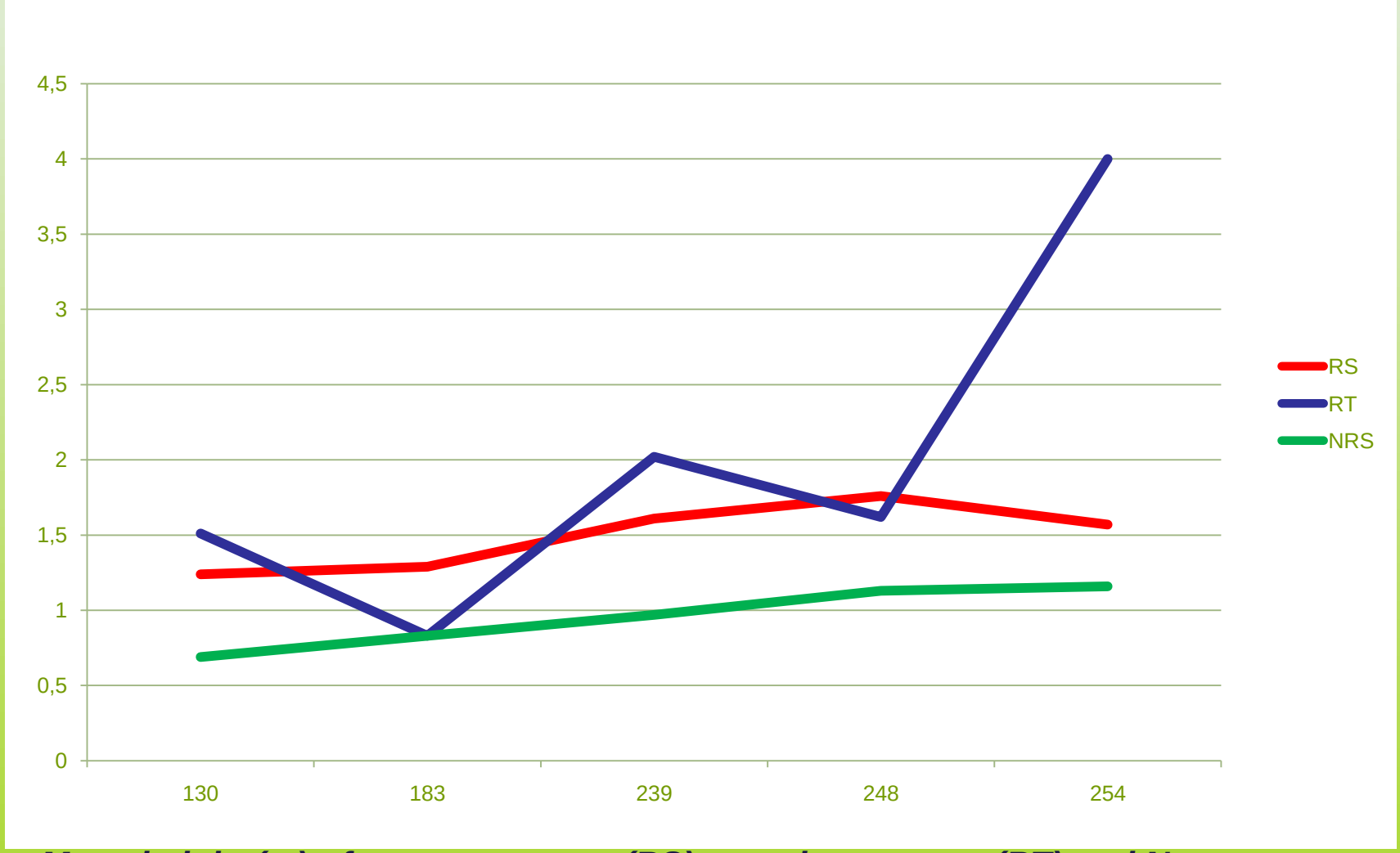

Figure : Mean height (m) of stump sprouts (RS), coppice sprouts (RT) and Non-stump sprouts -usually seedlings- (NRS) of Markhamia tomentosa, by age, in days after slash-and-burn .

On average 1225 young trees / ha are preserved. The five species: *Markhamia tomentosa, Hymenocardia ulmoïdes, Oncoba welwitschii, Pentaclethra eetveldeana, Millettia laurentii,* represent 82.6% of those kept by the farmers.

Results: weeding **RNA**

- Mean heights (m) according to Species

Species name	Numbers	Mean heights (m)	Standard Deviation	Growth Class
Oncoba welwitschii	19	0,73	0,31	Slow
Pentaclethra eetveldeana	17	0,81	0,41	Slow
Sapium cornutum	8	1,17	0,43	Mean
Millettia laurentii	10	1,20	0,26	Mean
Hymenocardia ulmoïdes	33	1,27	0,38	Mean
Markhamia tomentosa	120	1,39	0,65	Mean
Vitex congolensis	6	1,89	0,52	Fast

Results to be confirmed on larger numbers

Social acceptance is the most critical factor for successful large scale development of such techniques. This requires a long process of information, environmental awareness, negotiation and organization of producers

When there is no possibility to use ANR, due to the lack of coppice, farmers have the opportunity to plant young trees in their cultures.

After crops harvesting, trees will grow and improve the fallow.

This is easy with legumes such as Australian acacias but can also be done with local trees species

Such techniques can also be adapted to industrial concessions
in their efforts to rehabilitate deforested and/or unproductive areas and
in their approach towards sustainable management and certification.

But the fundamentalists foresters will ask us this question:

do plant trees or select coppice and then cut, burn and cultivate the plot are truly the work of foresters

?

Well, yes, agroforesters do think so, in the future, most of the tree biomass and a significant part of its biodiversity will be managed by farmers!

It is therefore essential for researchers to work on the enrichment of fallows, intensification of the parklands, management of groves, plantation of hedges, etc.

Thank You For your attention